IOT FUNDAMENTALS AND APPLICATION
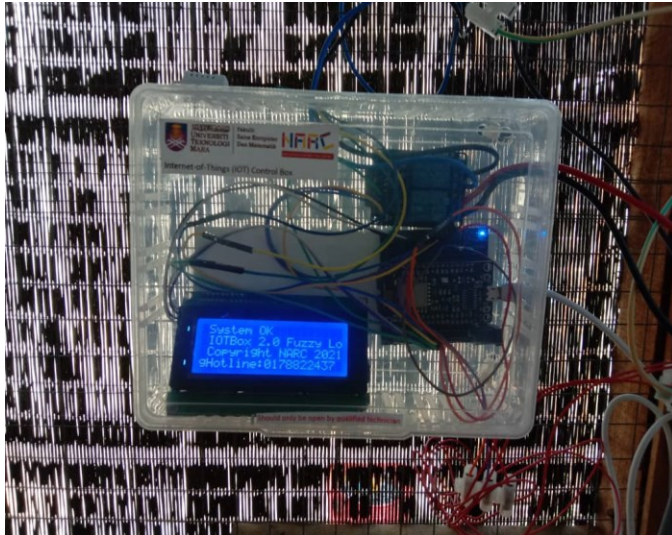
BY

MUHAMMAD AZIZI BIN MOHD ARIFFIN

ABOUT ME

- **Name:** Muhammad Azizi Bin Mohd Ariffin

- **Education:** Msc. Cyber Security (University of Lancaster, United Kingdom)

- **Current Job :** Lecturer, Centre of Computer Technology & Networking Studies (PPCTN), UiTM Shah Alam.

- Cisco Networking Academy CCNA, IoT, CyberOPS & DevNET Instructor.

- **Email:** mazizi@fskm.uitm.edu.my

- **Website:** https://mebikarbonat.github.io/

- **LinkedIn:** www.linkedin.com/in/muhammad-azizi-mohd-ariffin-87460666

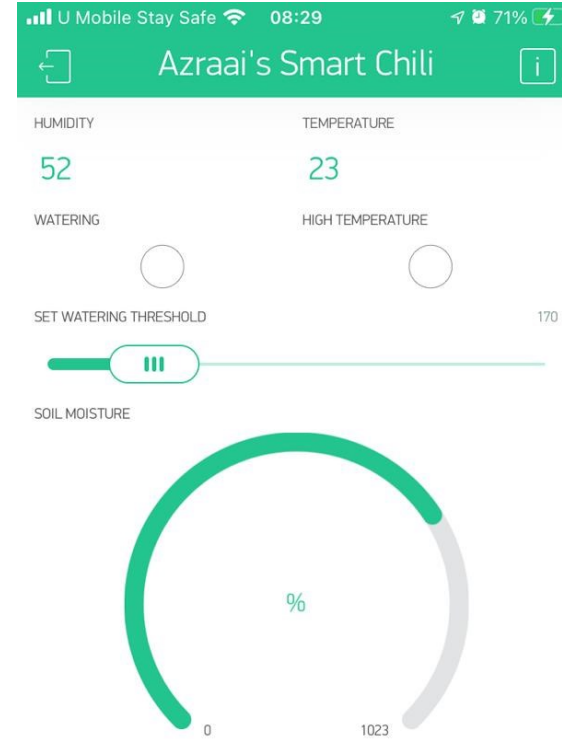- **GitHub:** https://github.com/mebikarbonat

INTERNET OF THINGS (IOT)

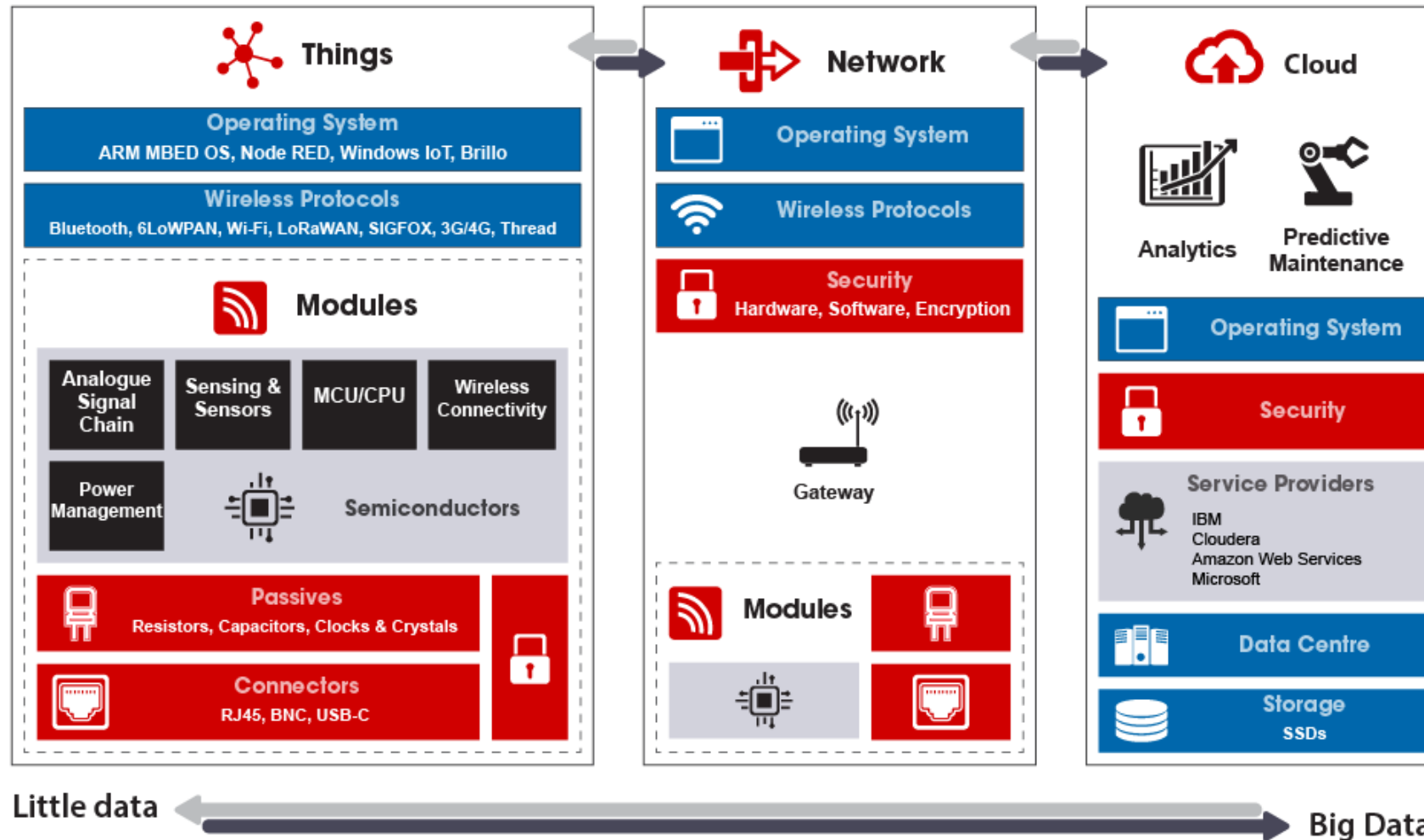- **Institute of Electrical and Electronics Engineers (IEEE) definition:**

    "A network of items, each embedded with sensors, which are connected to the Internet."
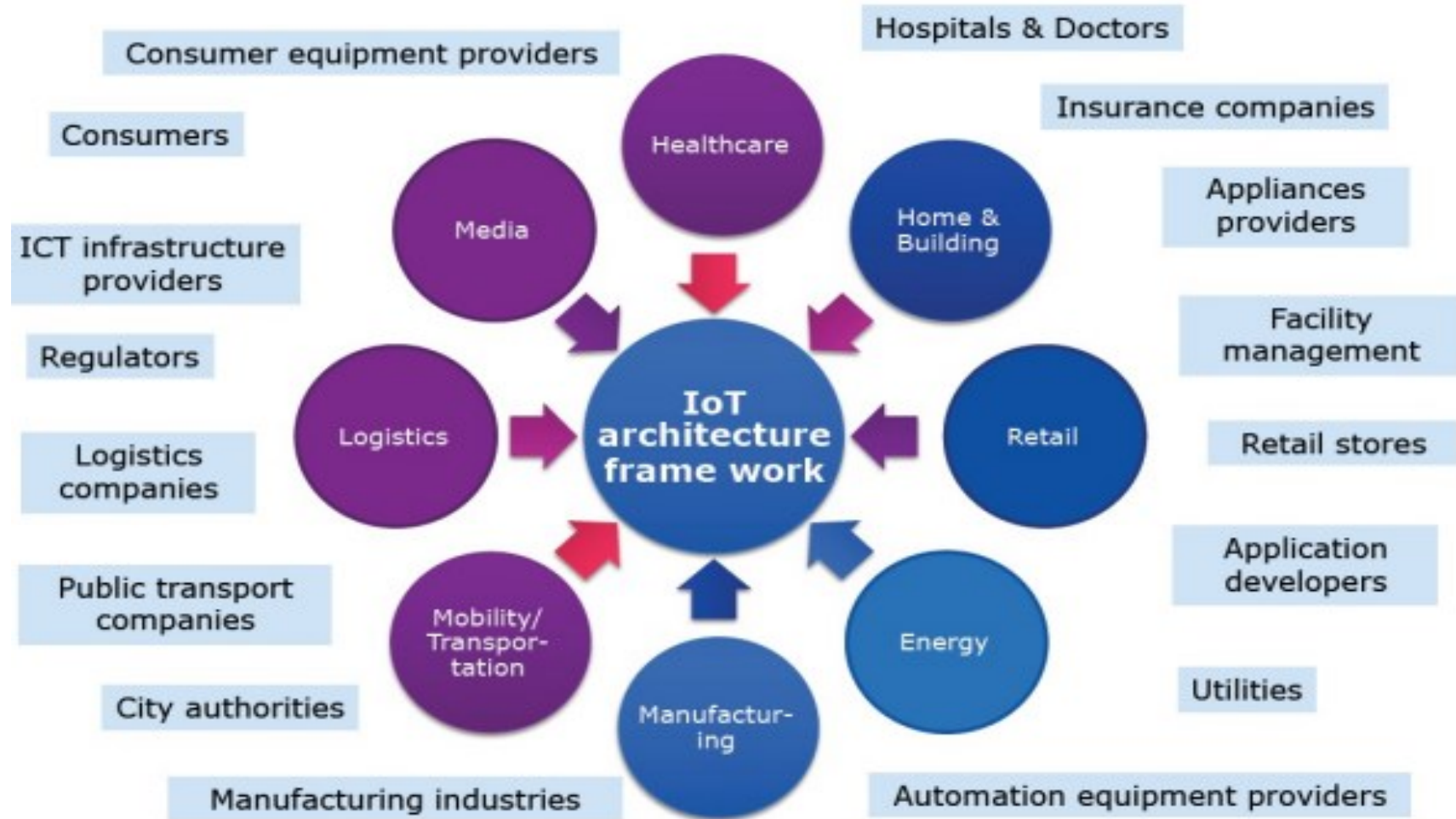
INTERNET OF THINGS (IOT)

IOT ARCHITECTURE

Source: RS Components Sdn Bhd
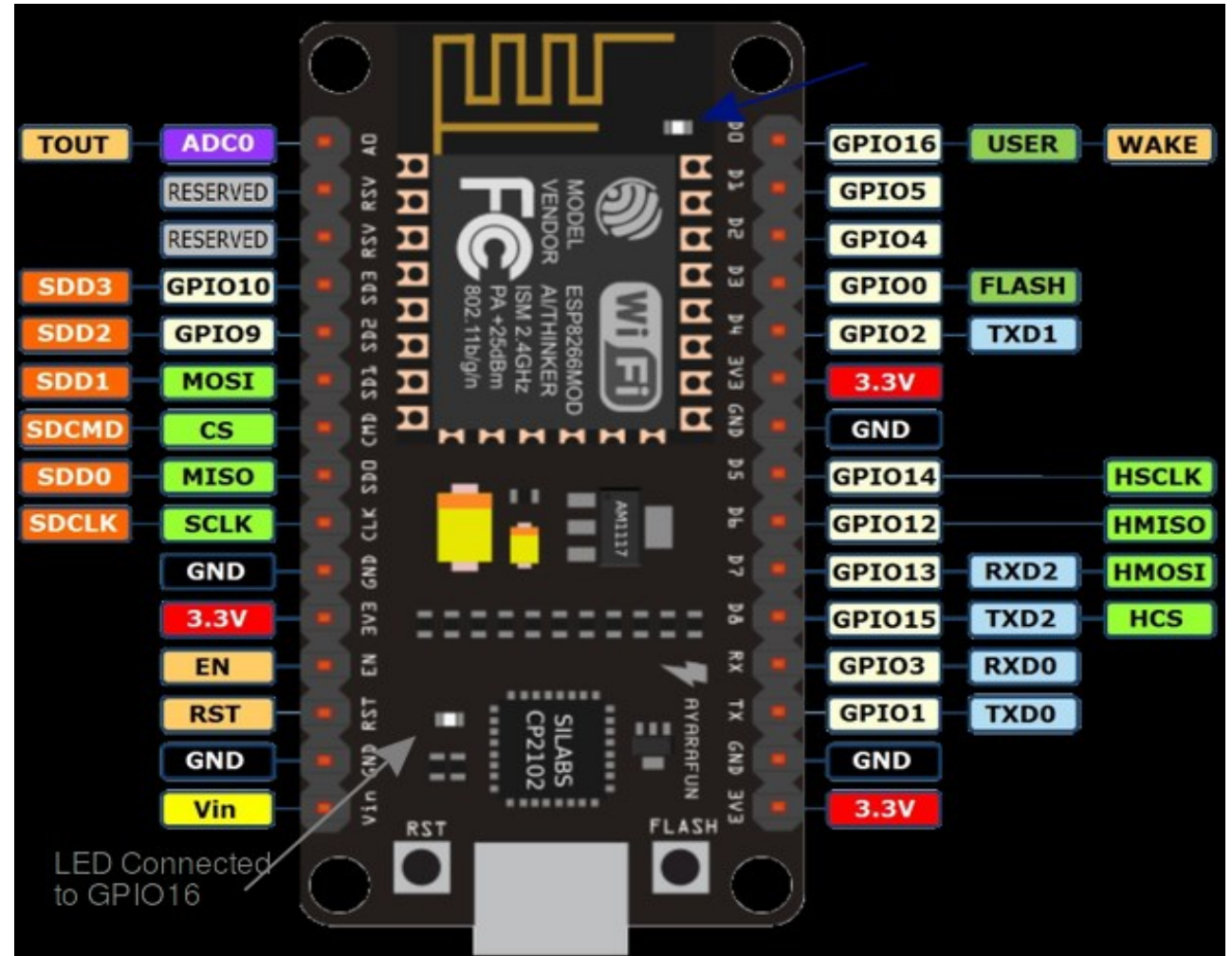
IOT APPLICATION

IOT APPLICATION

IOT HARDWARE (MICROCONTROLLER)

NodeMCU ESP8266

> NodeMCU ESP8266

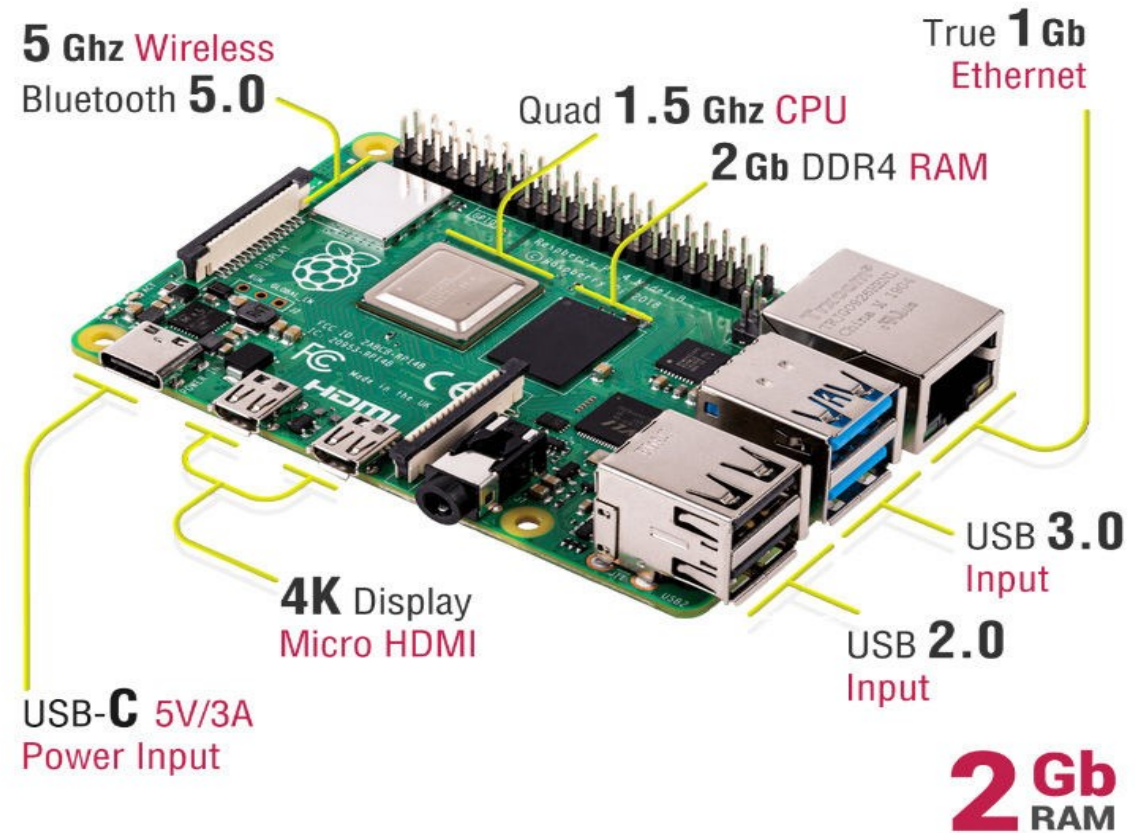> Development Board, STM32F410RB Nucleo-64 MCU

IOT HARDWARE (SINGLE-BOARD COMPUTER)
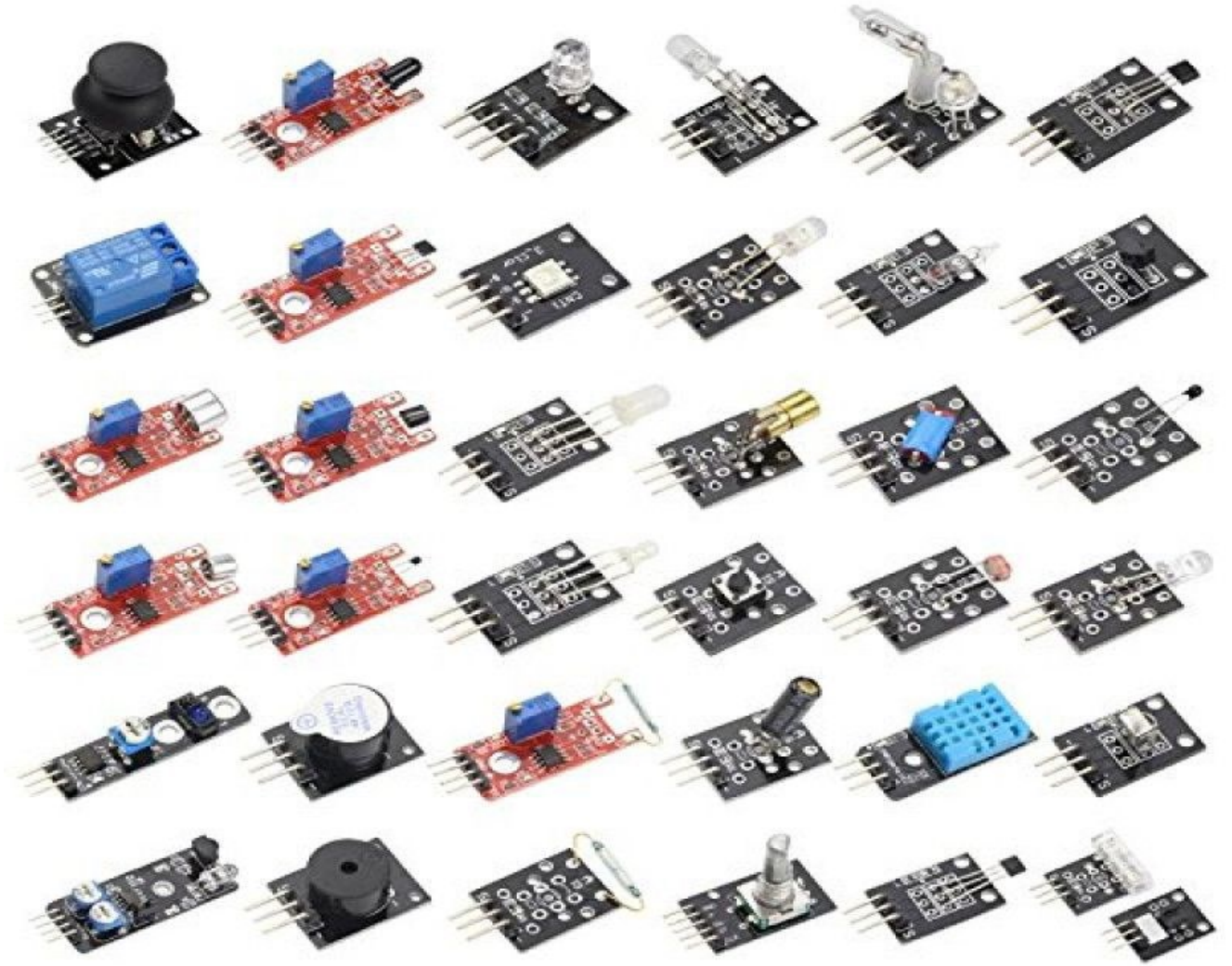
> Raspberry Pi Model 4B
> BeagleBoard

Raspberry Pi | Model 4 B

5 Ghz Wireless
Bluetooth 5.0

Quad 1.5 Ghz CPU
2 Gb DDR4 RAM

True 1 Gb Ethernet

USB 3.0 Input

USB 2.0 Input

4K Display Micro HDMI

USB-C 5V/3A Power Input

2 Gb RAM
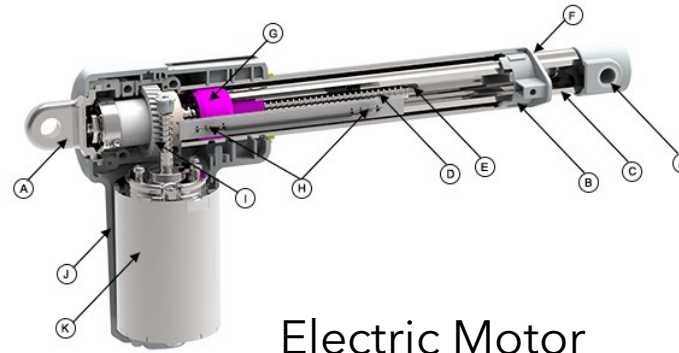
IOT HARDWARE (SENSORS)

> DHT11 & 22 (Temperature & Humidity)
> Soil Moisture Sensor
> CO2 Sensor
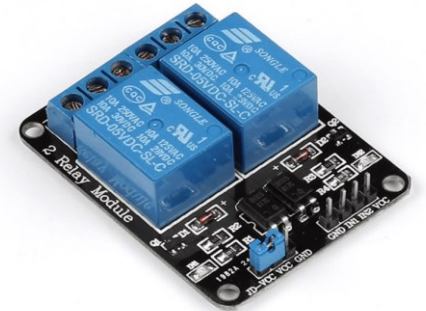> Gas Sensor
> PH Level Sensor
> Motion Sensor
> And many more..

IOT HARDWARE (ACTUATORS)

> Electrical Motor
> Water Pump
> Relay
> Buzzer
> And many more..
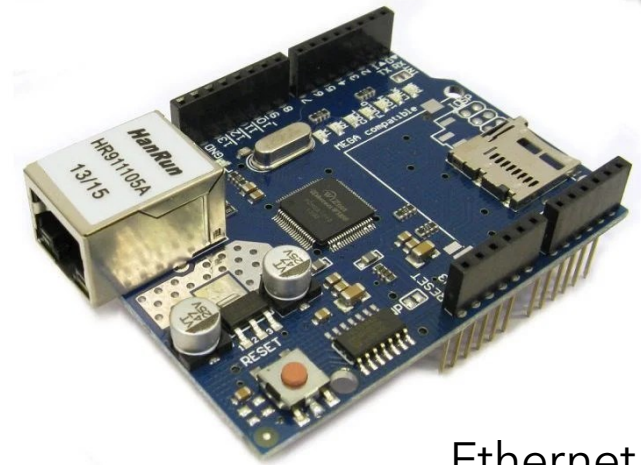
Electric Motor

5V Relay

Submersible Water pump

Buzzer

IOT HARDWARE (CONNECTIVITY)

> Wi-Fi
> Ethernet
> LoraWAN
> Bluetooth
> Zigbee
> GSM
> And many more..

ESP-01S ESP8266

Ethernet Shield

Lorawan Gateway

GSM Module
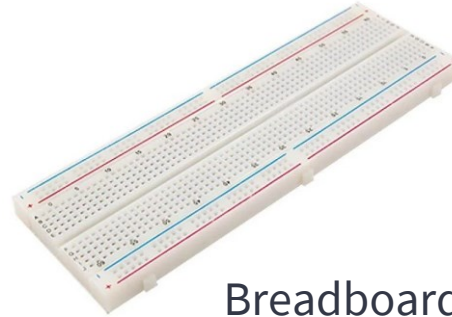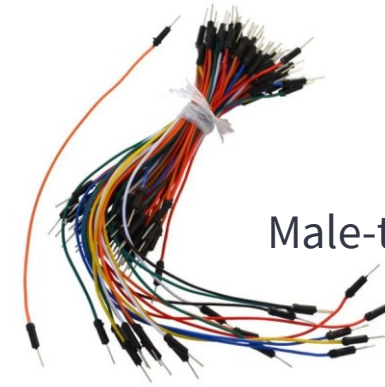
Wifi AP

IOT HARDWARE (MISCELLANEOUS)

> Breadboard
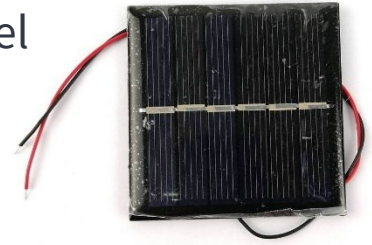> Jumper Wire
> LCD Display
> Push Button
> RGB LED
> And many more..

Solar Panel

Breadboard

Male-to-Male Jumper Wire
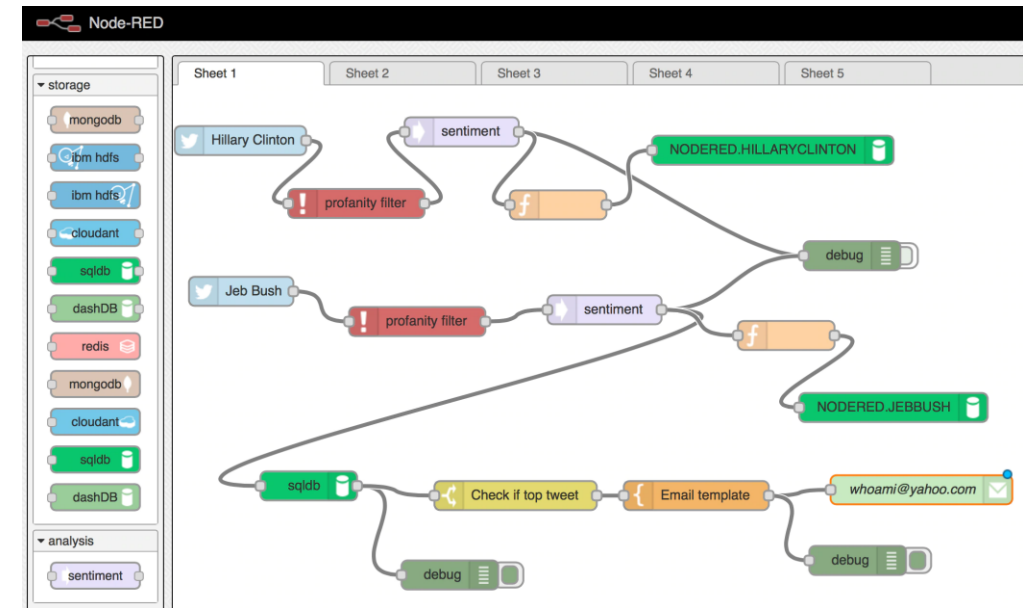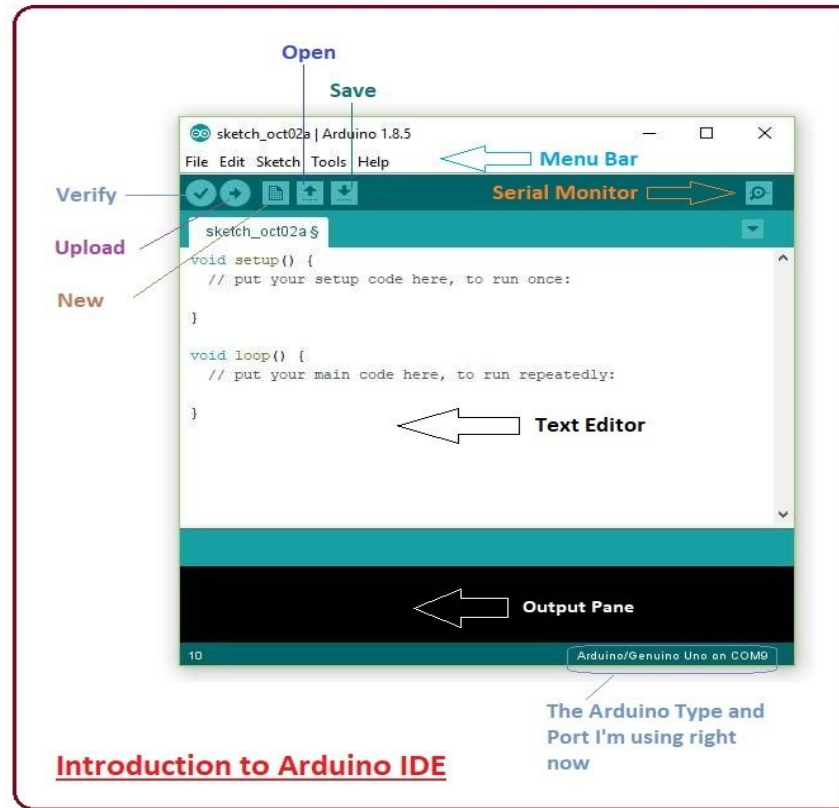
Resistor

Battery Holder

2x16 LCD with I2C Module

Push Button

RGB LED

IOT SOFTWARE

> Arduino IDE
> IBM NodeRED
> MicroPython

IOT CLOUD PLATFORM

Infrastructure as Service
- Amazon AWS
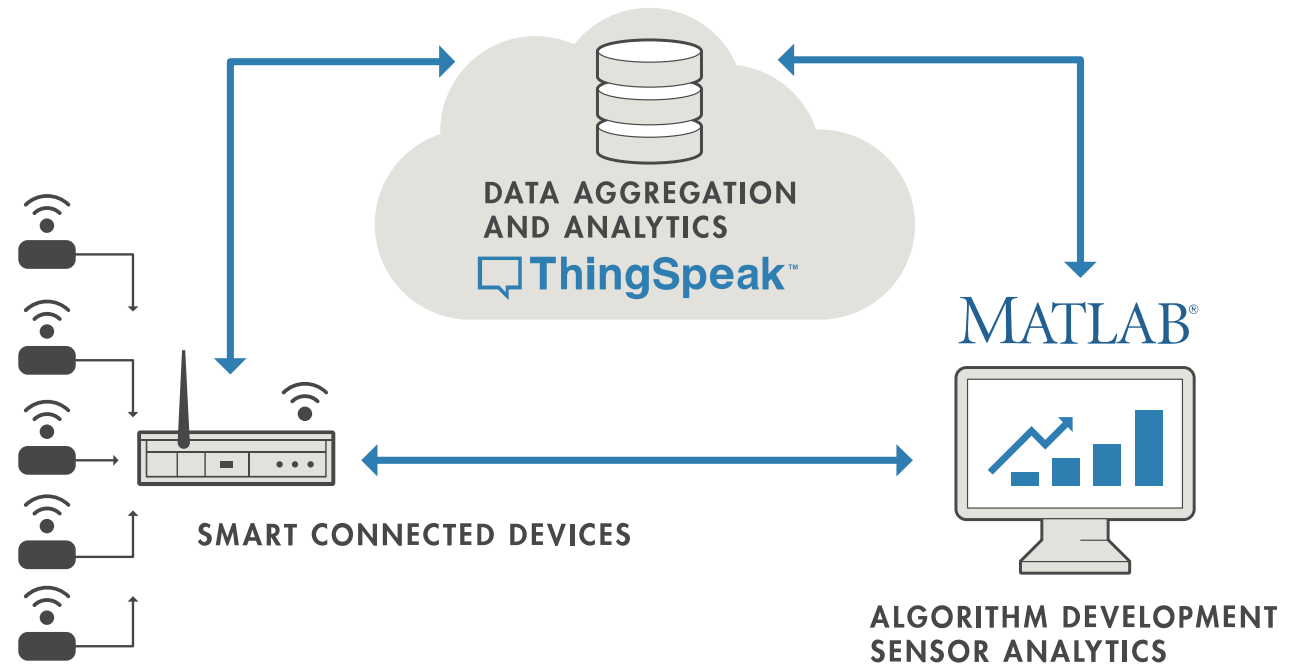- Digital Ocean

* Run Virtual Machine Instances and setup your own IoT Stack

Platform as Service
- Microsoft Azure IoT Hub
- Amazon AWS IoT Platform
- Cisco IoT Cloud Connect
- Google Firebase

Software as Service
- ThingSpeak (With REST or MQTT APIs)
- Blynk

DATA AGGREGATION AND ANALYTICS

ThingSpeak™

SMART CONNECTED DEVICES

MATLAB®

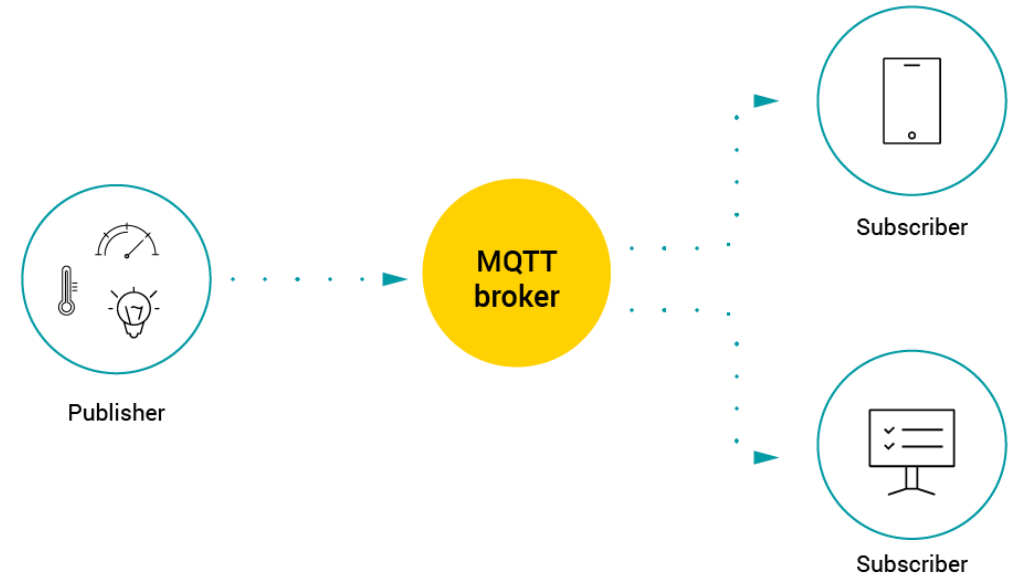ALGORITHM DEVELOPMENT SENSOR ANALYTICS

IOT PROTOCOLS

Message Queuing Telemetry Transport (MQTT)
- MQTT is based on subscriber, publisher and broker model.
- Having found wide application in such IoT devices as electric meters, vehicles, detectors, and industrial or sanitary equipment.
- Minimum bandwidth use over wireless network

Representational state transfer (REST) APIs
- A client-server architecture made up of clients, servers, and resources, with requests managed through HTTP.
- Stateless client-server communication, meaning no client information is stored between get requests and each request is separate and unconnected.
- Provide uniform interface.

Publisher

MQTT broker

Subscriber

Subscriber

WHERE TO BUY?

Online Store
- https://my.cytron.io/
- https://myduino.com/

Physical store
- Aiszzy Electronics Enterprise, Seksyen 7, Shah Alam.
- Myinvent Technologies Sdn Bhd, Seksyen 13 Shah Alam.
- Nixie Electronics (M) Sdn. Bhd., Jalan Pasar, Pudu, Kuala Lumpur.

LET'S SEE A DEMO

THANK YOU